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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/604,072	06/26/2000	Yoshihiro Miyamoto	000808	2708

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ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP  
1725 K STREET, NW  
SUITE 1000  
WASHINGTON, DC 20006

EXAMINER

SOLOMON, GARY L

ART UNIT PAPER NUMBER

2615

DATE MAILED: 12/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/604,072

Applicant(s)

MIYAMOTO, YOSHIHIRO

Examiner

Gary L Solomon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9 is/are rejected.
- 7) ☒ Claim(s) 5-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other:

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsang (US 5,900,623).

For claim 1, Tsang discloses:

A solid-state imaging device comprising:

a plurality of pixels (Abstract), including a light sensitive portion for photo electrically converting incident light (Figure 4, PHOTODIODE),

a transfer gate for transferring a charge stored in said light-sensitive portion (Figure 4, Element N2),

a resettable detection capacitor for storing said charge transferred from said transfer gate (Figure 4, Element MCAP), and

a selection switch for outputting a charge of said detection capacitor according to of a selection signal (Figure 4, Element N5);

a charge amplifier for converting to a voltage said detection capacitor charge, which is outputted from the pixels (Figure 3), and

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a correlated double sampling circuit for obtaining a voltage difference between a reset level and a detected level converted by the charge amplifier (Column 12, Line 10 through Column 13, line 26).

For claim 2, Tsang discloses all the previous limitations and Tsang also discloses wherein said charge amplifier is a capacitive feedback-type impedance conversion circuit (Figure 3).

For claim 3, Tsang discloses all the previous limitations and Tsang also discloses the said selection switch and transfer gate, wherein said charge amplifier converts to a reset voltage, a reset level of said detection capacitor, and said detection capacitor being connected to an input of said charge amplifier, and thereafter, converts to a detection signal voltage said charge (Column 12, Line 10 through Column 13, Line 26).

For claim 4, Tsang discloses:

a plurality of pixels (Abstract), including a light sensitive portion for photo electrically converting incident light (Figure 4, PHOTODIODE),

a transfer gate for transferring a charge stored in said light-sensitive portion (Figure 4, Element N2),

a resettable detection capacitor for storing said charge transferred from said transfer gate (Figure 4, Element MCAP), and

a selection switch for outputting a charge of said detection capacitor according to of a selection signal (Figure 4, Element N5);

a charge amplifier for converting to a voltage said detection capacitor charge, which is outputted from the pixels (Figure 3),

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a correlated double sampling circuit for obtaining a voltage difference between a reset level and a detected level converted by the charge amplifier and wherein a differential voltage between a reset level which said charge amplifier outputs when being reset, and a detection level, which said charge amplifier outputs in accordance with a charge outputted from said pixel, is outputted from said correlated double sampling circuit (Column 10, Lines 39-65; Column 13, Lines 15-26).

***Claim Rejections - 35 USC § 103***

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsang (US 5,900,623) in view of Pritchard (US 6,636,261).

For claim 9, Tsang discloses all the previous limitations, but lacks teaching wherein said reset gate maintains a quasi-conductive state while said light-sensitive portion stores a photo electrically converted charge.

However, Pritchard teaches a driven capacitor storage pixel sensor and array system wherein the reset is kept in a quasi-conductive state when the light sensitive portion stores the charge (Figures 2, 3A, 4, 5A, and 5B; Column 5, Lines 1-15).

Seemingly, the combination of these two inventions would have been clearly obvious to one of ordinary skill in the art at the time of the invention in order to prevent anti-blooming (Column 5).

***Allowable Subject Matter***

4. Claims 5-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following is a statement of reasons for the indication of allowable subject matter:

The examiner's prior art search fails to disclose the limitations indicated in the respective claims specifically: wherein said light-sensitive portion is formed by a second conductive-type cathode region, which is formed at a prescribed depth inside a first conductive-type semiconductor region, and said reset gate is a MOS-type transistor, which is formed by said cathode region, a reset gate electrode formed on said first conductive-type semiconductor region, and a second conductive-type drain region, which is formed inside said first conductive-type semiconductor region, and which has a higher concentration than said cathode region and also wherein said transfer gate is a MOS-type transistor, which is formed by said cathode region, a transfer gate electrode formed on said first conductive-type semiconductor region, and a second conductive-type output region, which is formed inside said first conductive-type semiconductor region, and which is connected to an input of said charge amplifier.

5. Claims 7-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The examiner's prior art search fails to disclose the limitations indicated in the respective claims specifically: wherein said first conductive-type semiconductor region is formed inside a second conductive-type well region, and is controlled such that a region directly beneath said cathode region of said well region is depleted.

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***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

o US 6,369,853

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L Solomon whose telephone number is (703)-305-4370.

8. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's primary, Vu Le can be reached on (703)-308-6613.

**Any response to this action should be mailed to:**


Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**Or faxed to:**

**(703) 872-9314**, (for informal or draft communications, please label  
"Proposed" or "Draft")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be  
directed to the customer service number **(703) 306-0377**.



December 15, 2003



VU LE  
PRIMARY EXAMINER